

**The Commercial Vehicle Safety Alliance  
North American Standard Level VI Inspection Program:  
Ensuring Safe Transportation of Radioactive Material - 9408**

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**ABSTRACT**

The Commercial Vehicle Safety Alliance (CVSA) is an organization of officials responsible for enforcing commercial vehicle safety in all 50 States, Canada, and Mexico. It developed the North American Standard Inspection Procedure that has been adopted by members to provide for a uniform vehicle safety inspection program. In cooperation with the U.S. Department of Energy (DOE), the CVSA has also developed an inspection program (the North American Standard Level VI Inspection Program) for highway shipments of spent fuel, high-level radioactive waste, and transuranic waste. As of January 1, 2005, all vehicles and carriers transporting highway route controlled quantities (HRCQ) of radioactive material are regulated by the U.S. Department of Transportation and required to pass the North American Standard Level VI Inspection. This paper discusses the details of the inspection program, the training of inspectors, the results of inspections to date, the peer review of states' implementation, and CVSA outreach efforts.

**INTRODUCTION**

In 1986, the Department of Energy (DOE) Office of Civilian Radioactive Waste Management (OCRWM) and the Commercial Vehicle Safety Alliance (CVSA) entered into a cooperative agreement to develop an enhanced inspection program to be used by states on eventual OCRWM shipments of highway route controlled quantities of radioactive materials to a repository. The goal was to develop a standard which would ensure the protection and safety of people and the environment by setting and enforcing rigid inspection standards and safeguards for the transportation of radioactive materials. It was decided that the way to meet this goal was to develop a higher level of inspection procedures, out-of-service conditions and/or criteria, an inspection decal unique to this inspection, and a training and certification program for state inspectors. In fulfilling the agreement the CVSA developed the North American Standard Level VI Inspection Program.

The Level VI standards were originally developed for specific OCRWM shipments. Upon conclusion of a pilot test of the procedures and standards, using shipments of Cesium,

LSA-Nitric Acid and spent nuclear reactor research fuel it was determined that the Level VI standards were appropriate for all shipments of Highway Route Control Quantities (HRCQ) and Transuranics. This determination had the concurrence of DOE and an overwhelming majority of the affected states, regional organizations, and the motor carrier radioactive material transporters. In July 1999, the CVSA membership adopted the use of the Level VI-(Enhanced North American Standard) Inspection Procedures and *North American Standard Out-of-Service Criteria* on all shipments of highway route controlled quantities of radioactive materials as defined by Title 49 CFR, Section 173.403, and all transuranics.

As of January 1, 2005, all vehicles and carriers transporting highway route controlled quantities (HRCQ) of radioactive material are regulated by the U.S. Department of Transportation and required to pass the North American Standard Level VI Inspection.

## **THE LEVEL VI INSPECTION PROGRAM**

The Level VI inspection program is funded through cooperative agreements with DOE. It is managed at CVSA by the Level VI Inspection Program Director. The Radioactive Materials Subcommittee of the CVSA Hazardous Materials Committee provides guidance and support to the program. The program provides the framework for state inspections of SNF and HLW shipments. This includes the *North American Standard Out-of-Service Criteria for Transuranic Waste and Highway Route Controlled Quantities of Radioactive Material*, inspection procedures, radiological survey procedures, and training for inspectors. Key to the program is an inspection that ensures that vehicle, drivers and cargo are "defect free" by the Level VI inspection standard before they may leave their point of origin. While en route the Level VI out -of-service criteria is applied, not the "defect free" inspection standard.

A Level VI Inspection employs higher or stricter inspection standards than the regular Level I North American Standard Inspection. One example of the stricter standard is that under the Level I Inspection standard if 20% or more of the brakes on the vehicle or combination are out of adjustment the vehicle is placed Out-of-Service. Under the Level VI inspection standard, if any brakes are out of adjustment, the vehicle is placed Out-of-Service.

A special decal has been developed for vehicles meeting the Level VI inspection criteria. The decal is affixed at the point of origin of the shipment and removed at the destination. It is valid for only one trip.

## **INSPECTOR TRAINING**

A major requirement of the OCRWM/CVSA cooperative agreement is the development and conduct of training courses for personnel who carry out the Level VI inspections. The curriculum is modular and includes pertinent laws and regulations, inspection

procedures and techniques, information on radiation and detection methods, reporting, and security. A typical course lasts three days and includes:

- an introduction to radioactive shipments and the Level VI Program
- an introduction to radiation and radioactivity
- a discussion of radioactive material regulations
- radiation survey instruments and radiation survey and detection procedures
- Level VI inspection procedures and reports
- security
- practical exercises involving actual inspections of a vehicle carrying a WIPP TRUPACT container or a SNF cask

The curriculum would be revised if inspection criteria changed, students or instructors suggest better methods of presenting material, or new issues such as handling of safeguards information needed to be addressed. At a minimum the Level VI Inspection Program Director and the Level VI instructors meet annually to review the curriculum and make any necessary changes to it.

CVSA provides Level VI training to vehicle inspectors who meet the prerequisites of being CVSA Level I and HAZMAT certified. States and federal agencies who wish to have inspectors trained request CVSA for class slots. There are also opportunities for industry, such as trucking firms, to send students to audit the courses (they do not receive certifications). Approximately 9 classes are held each year in various states that volunteer to host them. The schedule of classes for 2009 is:

- Sacramento, CA – October 29 - 23
- Austin, TX – November 3 – 6
- Salt Lake City, UT – January 12 – 15
- Las Vegas, NV – Level VI Train the Trainer Course – February 11 - 12
- Las Vegas, NV - March 16-20, 2009
- Indianapolis, IN - May 11-14, 2009
- Sacramento, CA - September 28 - October 1, 2009

From August 1992 through November 2008 there have been 107 basic CVSA Level VI inspector training classes with a total of 1853 attendees. As of November 2008 there are a total of 768 certified Level VI inspectors in 39 states. Table 1 lists these states and the number of inspectors in each one. Additionally there are 5 U.S. federal and Canadian Level VI inspectors.

Table 1. States with Level VI Certified Inspectors

<b>States with Level VI Certified Inspectors</b>			
<b>State</b>	<b>Number of Level VI Inspectors</b>	<b>State</b>	<b>Number of Level VI Inspectors</b>
Alabama	4	Nebraska	12
Arizona	5	Nevada	25
California	101	New Jersey	3
Colorado	17	New Mexico	74
Connecticut	7	New York	25
Florida	14	North Carolina	5
Georgia	10	Ohio	22
Idaho	17	Oregon	15
Illinois	99	Pennsylvania	28
Indiana	4	Rhode Island	2
Iowa	5	South Carolina	12
Kansas	13	Tennessee	38
Kentucky	2	Texas	33
Louisiana	11	Utah	9
Maryland	26	Virginia	5
Massachusetts	6	Washington	50
Michigan	10	West Virginia	4
Minnesota	6	Wisconsin	9
Mississippi	5	Wyoming	10
Missouri	25		

CVSA also provides an Industry Awareness course for drivers of the WIPP contract carriers. The Industry Awareness course is designed to train drivers to inspect their vehicles and to understand how to be in compliance with the Federal Motor Carrier Safety Administration (FMCSA) regulations. Since March 1998 there have been 19 Industry Awareness classes with a total of 105 attendees.

The Level VI instructors are certified Level VI inspectors who volunteer to prepare for and conduct the training. They have the support of their states and agencies which cover, at least partially, their time. CVSA provides for their travel and per diem. Currently there are nine National instructors who come from the states of California, Idaho, Illinois, New York, Ohio, Pennsylvania and West Virginia and from the FMCSA.

To ensure that Level VI inspectors keep current with the latest inspection criteria and procedures, CVSA has developed the following requirements that must be met by an inspector in order to remain certified:

- Successfully complete the CVSA Level VI refresher course within a 24 month period of the basic Level VI course, or
- Demonstrate proficiency by performing a minimum of eight CVSA Level VI inspections of radioactive shipments per year

- If the inspector does not complete one of the above requirements then certification is suspended. To become recertified, the inspector must attend and successfully complete the basic CVSA Level VI inspector training class.

## INSPECTION RESULTS

Since 2004 CVSA has published an annual report on the results of the Level VI inspections that have been conducted in the previous years. Each year the report is updated with a new year's data. The following information is obtained from the latest annual report (found on CVSA's website:

[http://www.cvsa.org/documents/level\\_vi\\_2006\\_annual\\_report\\_jan\\_08.pdf](http://www.cvsa.org/documents/level_vi_2006_annual_report_jan_08.pdf)).

Most of the Level VI inspections have been for shipments to the DOE Waste Isolation Pilot Plant. During the period March 24, 1999 – December 31, 2006 there have been a total of 11,058 Level VI inspections of shipments to WIPP. Table 2 gives the number of violations found and the Level I and Level VI out-of-service rates for these inspections.

Table 2. Review of Entire CVSA Level VI Inspections for WIPP Shipments

<b>CVSA Level VI Inspection Data for WIPP Shipments (March 24, 1999 – December 31, 2006)</b>				
Inspection Activity	Number	Percent	Level I OOS Percent	Level VI OOS Percent
Number of Inspections	11,058			
With no Violations	10,133	91.64%		
With Violations	925	8.36%		
Driver OOS* Rate		0.07%	0.06%	0.01%
Vehicle OOS Rate		2.11%	0.66%	1.45%

\*OOS = Out-of-Service

For 2006 (the latest year reported in the current annual report) Table 3 and Table 4 give the number of inspections by state and type (point of origin, en route, and point of destination) for WIPP and non-WIPP shipments, respectively.

Table 3. WIPP Shipments: Number and Type of Inspections by States

**January 1, 2006 – December 31, 2006**

<b>State</b>	<b>Point of Origin</b>	<b>En Route</b>	<b>Total</b>
California	0	0	0
Colorado	0	707	707
Georgia	0	1	1
Idaho	797	0	797
Illinois	0	0	0
Nevada	0	0	0
New Mexico	106	332	438
Oregon	0	14	14
South Carolina	139	0	139
Washington	78	0	78
Total Number of Inspections	1120	1054	2174

Table 4. Non-WIPP Shipments: Number and Type of Inspections by States

**January 1, 2006 – December 31, 2006**

<b>State</b>	<b>Point of Origin</b>	<b>En Route</b>	<b>Point of Destination</b>	<b>Total</b>
Colorado	0	1	0	1
Idaho	3	0	0	3
Illinois	0	70	0	70
Maryland	5	1	0	6
Massachusetts	2	0	0	2
Michigan	11	0	0	11
Missouri	2	1	0	3
New Jersey	1	0	0	1
New Mexico	0	24	0	24
New York	0	30	0	30
Ohio	17	7	0	24
South Carolina	8	0	15	23
Tennessee	0	1	0	1
Virginia	1	0	0	1
Total Number of Inspections	50	135	15	200

Table 5 is the comparison of WIPP and non-WIPP CVSA Level VI inspections in 2006. Non- WIPP inspections have almost double the driver and vehicle out-of-service violations as compared to WIPP inspections. Tables 5 and 6 present a comparison of CVSA Level VI inspection information to data for the same period from the Federal Motor Carrier Safety Administration (FMCSA). This comparison shows that the Level VI inspections have considerably lower out-of-service rates.

Table 5. Comparison of WIPP Shipments with Non-WIPP Shipments

<b>CVSA Level VI Inspection Data for WIPP Shipments (January 1, 2006 – December 31, 2006)</b>				
Inspection Activity	Number	Percent	Level I OOS Percent	Level VI OOS Percent
Number of Inspections	2,174			
With no Violations	1,954	89.88%		
With Violations	220	10.12%		
Driver OOS* Rate	3	0.14%	0.14%	0.00%
Vehicle OOS Rate	78	3.59%	1.29%	2.30%

  

<b>CVSA Level VI Inspection Data for Non-WIPP Shipments (January 1, 2006 – December 31, 2006)</b>				
Inspection Activity	Number	Percent	Level I OOS Percent	Level VI OOS Percent
Number of Inspections	200			
With no Violations	153	76.50%		
With Violations	47	23.50%		
Driver OOS Rate	1	0.50%	0.50%	0.00%
Vehicle OOS Rate	14	7.00%	6.50%	0.50%

\*OOS = Out-of-Service

Table 6. FMCSA Inspection Data

<b>FMCSA Roadside Inspection Data for the Year 2006*</b>			<b>FMCSA HAZMAT Inspection Data for the Year 2006*</b>		
Inspection Activity	Number	Percent	Inspection Activity	Number	Percent
Number of Inspections	3,329,442		Number of Inspections	191,369	
With no Violations	937,968	28.17%	With no Violations	156,201	81.62%
With Violations	2,391,474	71.83%	With Violations	35,168	18.38%
Driver OOS** Rate	225,531 †	7.08%	OOS Rate	10,126	5.29%
Vehicle OOS Rate	551,587 †	22.89%			

† The number of inspections is a combination of some Driver, some Vehicle and some combination of both. The OOS Rates are for only those types of inspections.

## **PEER REVIEWS**

CVSA conducted a peer review of the Level VI program to identify and share best practices and to make recommendations to prepare the Level VI inspection program for shipments of spent nuclear fuel to Yucca Mountain. The peer review teams consisted of representatives from the CVSA Radioactive Material (RAM) Subcommittee, Council of State Governments Northeast and Midwest Offices, Southern States Energy Board, Western Governors' Association, DOE, and WIPP carriers. The teams visited seven states (South Carolina, Colorado, Tennessee, Washington, Illinois, New Mexico and Michigan) between March 2005 and August 2006. A report was published (found on CVSA's website: <http://www.cvsa.org/documents/levelvipeerreviewreportjan07.pdf>). There are plans to visit two more states this year and the report will be updated with the new information.

The CVSA RAM Subcommittee is working on the implementation of the Level VI Peer Review in the following manner:

- Develop a "Lead Level VI Inspectors" state list and post it on the CVSA Level VI website to facilitate sharing information on the best practices for the Level VI Program found in the Peer Reviews.
- Enhance guidance to the Level VI state refresher instructors on Level VI training material updates/additions, requirements for the refresher course, and other program updates and highlights.
- Develop a "blog" to the Level VI website where the states and public can go to for FAQ and to get feedback on the Level VI Program from the Level VI team.

## **OUTREACH PROGRAM**

The CVSA Outreach program is designed to inform the public on the very successful Level VI Inspection program. Specifically the Outreach program's goal is to educate target audiences and provide information on shipments of transuranic waste and Highway Route Controlled Quantities (HRCQ) in the U.S. Using a display unit, publications and presentations, the Level VI Public Outreach Coordinator travels throughout the U.S. to present and discuss the Level VI Inspection program at local and national events. Since 2005 the Outreach Coordinator has attended 36 such events to promote the Level VI Inspection program. These events include conferences (e.g., National Congress of American Indians, National Association of Counties, Waste Management), workshops (e.g., Contractors Transportation Management Association) and meetings (e.g., DOE Transportation External Coordination Working Group). Table 7 is a list of the events the Outreach Coordinator plans to attend in 2009.

Table 7. Level VI Public Outreach Schedule for 2009

<b>Date</b>	<b>Event and Location</b>
January 25-30, 2009	<i>Cooperative Hazardous Materials Enforcement Development (COHMED)</i> Phoenix, AZ
February 4-6, 2009	<i>Industrial Fire, Safety &amp; Security</i> Houston, TX
March 1-5, 2009	<i>Waste Management Symposium</i> Phoenix, AZ
March 29 - April 1, 2009	<i>Council on Safe Transportation of Hazardous Articles (COSTHA)</i> Long Beach, CA
June 8-12, 2009	<i>Contractors Transportation Management Association (CTMA)</i> Melbourne, FL
July 24-29, 2009	<i>National Association of Counties (NACO)</i> Nashville, TN
August 30 - September 2, 2009	<i>Governor's Highway Safety Association (GHSA)</i> Savannah, GA
September 19-24, 2009	<i>Commercial Vehicle Safety Alliance (CVSA)</i> Baltimore, MD
October 3-7, 2009	<i>International Association of Chiefs of Police (IACP)</i> Denver, CO

## CONCLUSIONS

State law enforcement agencies with certified Level VI inspectors are capable of inspecting all shipments of Highway Route Controlled Quantities (HRCQ) radioactive material and transuranic wastes. The CVSA Outreach program provides information to the states and the public on the transportation of radioactive materials. The Level VI Inspection Program working with States, U.S. Department of Energy, dedicated motor carriers, contributes to the safe transportation of radioactive materials in the U.S.